REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Applicants affirm election with traverse to Group I, claims 1-20 and will request rejoinder of claims 21-23 under the *Ochiai* guidelines.

Drawings

Applicants attach hereto an amended Figure 1, which has been labeled "Prior Art" as requested by the Examiner.

Rejections Under 35 USC § 103

The present claims are rejected over combinations of (I) Nishimura (US 2003/0067259) in view of Yamada (US 6,245,249); (II) Nishimura (US 2003/0067259) in view of Yamada (US 6,245,249) and in further view of Goto (US 5,569,569); or (III) Nishimura (US 2003/0067259) in view of Yamada (US 6,245,249) and in further view of Nakamura (US 5,773,843). Applicants traverse these rejections for the following reasons.

To establish a *prima facie* case of obviousness, the burden is upon the Examiner to demonstrate the following three elements: (1) motivation to combine or modify references, (2) a reasonable expectation of success and (3) a teaching or suggestion of all the elements of the claims. If applicants can demonstrate that at least one of these elements has not been met, a *prima facie* case of obviousness has not been established and the rejection is improper. MPEP § 706.02(j).

As described in paragraphs [0004] to [0007] and figure 1 of the present application, "when a nano-gap electrode is made using the FIB lithography, the ions can easily pass through a metal electrode and may reach an underlying insulating substrate. This presents a problem in that the insulating characteristic of the nano-gap electrode may be changed by the FIB"(see paragraph [0005]) and "[t]he ion implantation into the insulating substrate can be reduced using the metal electrode thicker than the ion penetration length"(see paragraph [0007]). Figure 1 and paragraph [0006] describe penetration depth or length.

Because the present invention involves a method wherein "the thickness of the electrode layer is larger than a maximum ion penetration length of the focused ion beam in the mask pattern forming step", it can solve the above described problem.

Nishimura does not disclose preventing the ion implantation into the insulating substrate and there is no disclosure or suggestion, rather the contrary is evident, of taking "the thickness of the electrode layer is larger than a maximum ion penetration length of the focused ion beam in the mask pattern forming step". Although Yamada discloses a patterning process, wherein FIB can be used, Yamada does not produce an electrode with a nano-gap and there is no motivation to take "the thickness of the electrode layer is larger than a maximum ion penetration length of the focused ion beam in the mask pattern forming step" to prevent the ion implantation into the insulating substrate.

Making "the thickness of the electrode layer is larger than a maximum ion penetration length of the focused ion beam in the mask pattern forming step" is not routine skill. As disclosed in paragraph [0007] of the present application, "to fabricate narrow gaps, it is necessary to use a thin organic resist film." Producing a thick electrode using such a thin organic resist film is very difficult. Therefore, one of ordinary skill in the art would not have chosen an electrode layer wherein the thickness is larger than a maximum ion penetration length of a FIB.

As further evidenced by the attached 132 Declaration by Dr. Takashi Nagase, it would not have been possible to produce the present invention with the focused beam of Yamada.

Moreover neither Nishimura nor Yamada would have motivated one of ordinary skill in the art to attain the nano-scale gap electrode, especially 2 nm to 12 nm, because the teachings of these references are completely different from the present invention. As noted by the Examiner at page 6 of the outstanding Office Action, Nishimura (as well as any other cited reference) fails to explicitly teach a nano-gap electrode much less the specific ranges. There is no teaching or suggestion in any of the prior art references (Nishimura, Yamada, Goto or Nakamura) of a nano-gap electrode or a 2 nm to 12 nm or 4 nm to 6 nm nano-gap electrode. The Examiner offers no evidence to support the proposition that such a nano-gap

electrode was obvious and involved routine skill. Applicants contend that miniaturization on a nanoscale level is anything but routine skill. A nanometer is an incredibly small unit of length, for example, the width of a single DNA helix is 2 nanometers. Therefore, miniaturization on a nanoscale is not a routine matter for one of ordinary skill.

Also, applicants contend the facts of *In re Boesch*, 617 F.2d 272, (CCPA 1980) are not analogous to the facts at hand. In *Boesch*, at issue was an applicant that made an alloy composition, from inorganic elements known in the prior art. Not only were the alloy elements known in the prior art, but the ranges were overlapping with the prior art. "[T]here was no substantial disagreement [on the part of the applicant] that both Pohlman et al. and Lamb [the prior art] disclose alloys having compositional limits overlapping those of the claimed alloys." *Boesch* at 275. Thus *Boesch* involved the optimization of overlapping ranges of an alloy. Nothing in *Boesch* related to miniaturization on a scale down to the nano (molecular) level. Therefore, the facts of *Boesch* are not analogous and do not relate to the present invention.

In addition, the Examiner has not established why one of skill in the art would have had a reasonable expectation of success of the present invention, another essential prong in establishing a *prima facie* case of obviousness. Applicants contend that miniaturization on a nanoscale is not routinely predictable. The Yamada reference, which is the secondary reference that forms the basis of all of the claim rejections, relates to structures of the micrometer scale, which by definition are 1,000 larger than those of the nanometer scale. (See for example abstract of Yamada.) Nothing in the other cited references makes up for the deficiencies of Yamada. Therefore, the application of Yamada to the present invention, in any combination with the other cited references (Nishimura, Goto or Nakamura) does not establish a reasonable expectation of success of the present invention. Accordingly, a *prima facie* case of obviousness has not been established by the Examiner.

Finally, applicants urge that the Examiner has proffered no reason as to why one of ordinary skill in the art would be motivated to create a nano-gap electrode. Therefore, motivation for the present invention has not been established.

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By _____

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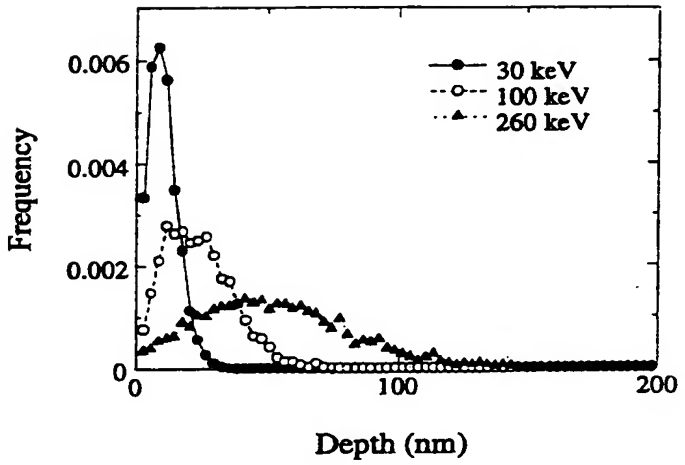
Fig. 1



PRIOR ART